Tree Growth Field Trial at Monocacy
Natural Resources Management Area
3rd Season, 2006

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A seedling growth field trial was initiated at Monocacy NRMA in 2004 to monitor the development and survival of seedlings under four different growing conditions namely, growing without any type of protection, growing in tree shelters at a 10' x 10' and 20' x 20' spacing, and growing inside deer fencing. The purpose of this study is to examine and record such parameters as seedling growth and development, survival, cost of establishment and expenses associated with subsequent maintenance practices. This information is collected each year in late October at the end of the growing season. A comprehensive article outlining the study was posted last year on this website. The purpose of this article is to provide an update for the 2006 growing season.

Maintenance Practices: We increased our mowing schedule in 2006 from two to three mowings per season. These mowings were conducted in June, August, and late September. (In the previous seasons we mowed in June and September.) The purpose of the additional mowing was to keep the size of vegetation at a manageable level for our zero-turn radius mower; and, to help ensure that Canadian thistle was not permitted to go to seed. Besides the mowings, some spot control of thistle was conducted in June with a back pack sprayer using the herbicide *Stinger*, and a more comprehensive thistle control was conducted by Frederick County Weed Control in October using the herbicide *Transline*. During 2006 we also had to replace some of the metal support stakes for the deer fencing because they had bent in strong winds or had corroded and fractured under stress. The total cost of general maintenance for 2006 was $600 or $75/compartment. The total cost for the deer fence repair was $150.00.

Growth and Survival Measurements: Our annual growth measurements were gathered during a cold, blustery day in late October. The information gathered along with measurements taken during the previous two years will form the basis of a final report which will be prepared after data has been collected in October of 2007. The average diameter and height growth and survival percent recorded for each compartment is illustrated in the following table:

2006 Results: Diameter, Height, and Survival recorded on October 24, 2006.

	Red Oak	Green Ash	Black Walnut

Deer Fence	.48 " diameter 52" height 80% survival	1.09" diameter 82" height 98% survival	.95" diameter 62" height 94% survival
10' x 10' 50% covered	.31 diameter 46" height 64% survival	.48 diameter 50" height 91% survival	.43 diameter 47" height 87% survival
No Protection	.32 diameter 22" height 11% survival	.44" diameter 26" height 95% survival	.37 diameter 20" height 84% survival
20' x 20' 100% covered	.34 diameter 46" height 84% survival	.49" diameter 50" height 89% survival	.37" diameter 46" height 85% survival

Growth Measurement Observations: All of the species in the deer fenced area continue to increase in height and diameter growth and the survival remains in a desirable range; the red oak had the lowest survival at 80% inside the deer barrier. Increases in diameter and height growth were also observed in the 20' x 20' and 10' x 10' compartments where tree shelters were employed. However, the height growth seems to be stagnating near the top of the 48" tall shelter. It is obvious that deer are nipping these trees back to the lip of the enclosure. This is especially true with the red oak and green ash and not so much with the walnut which is probably distasteful to the deer. Overall survival is adequate in all of the sheltered sites although the 64% survival for red oak in the 10' x 10' compartment is nearing an undesirable level. The mortality observed in the unsheltered red oak in this compartment is causing this reduction in overall survival. Trees in the 5' x 10' compartment that are growing with no protection are being browsed back to a 20" – 30" height, which is similar to the 2005 readings. Survival for unsheltered red oak in this compartment took a dramatic turn for the worse displaying an 11% survival rate. Survival for unsheltered green ash and black walnut remains at an acceptable level.

Other observations: It appears that deer are having the greatest impact on seedling growth, development and survival in this planting. Deer feeding pressure is causing the height growth of sheltered trees to stagnate around 48 inches tall and 27 inches for the unsheltered individuals. Much of the seedling mortality can also be attributed to deer although the 17-Year Cicada, white footed mouse, and mowing damage has claimed some trees as well. The cicada damage was addressed in the previous article and it appears to have resulted in some mortality; however realizing that unshelted red oak in the deer fence have 80% survival and unguarded oaks outside the barrier are averaging 11% survival demonstrates the impact deer are having on this plantation. The plantations inside the deer fence have the greatest overall growth and survival, and trees have the most natural appearance maintaining their terminal buds and normal growth characteristics. The metal poles used to support the deer fence are bending in strong winds and many are showing signs of rust so they may be more likely to bend or break under stress. (Employing pressure treated lumber posts to support the fence as an option

should increase the strength and lifespan of the enclosure as a whole.) The 2006 growing season was somewhat dry, with arid spells in March and August. However, I would not consider this to constitute severe drought and the overall seasonal rainfall was near average. As such, I don't think that lack of rainfall influenced growth or survival to any great extent. More regular mowing seems to be reducing the weed problems and making it easier and less demanding to mow the site with our zero- turn mower. This frequent mowing is also enabling the clover to flourish as a cover crop since it reduces overhead competition. (A nearby field which had the same cover crop planted at the same time has lost most of the clover, probably due to the less frequent, mowing cycle of one cutting per season.)

Next year will be the final year that survival and growth measurements will be taken and maintenance costs recorded. Nonetheless, we will continue to nurture the plantation until we feel that trees are in a free to grow condition so that the site can reforest as was the original plan. Given the present condition, some areas will have to be replanted and the young trees will probably have to be protected.